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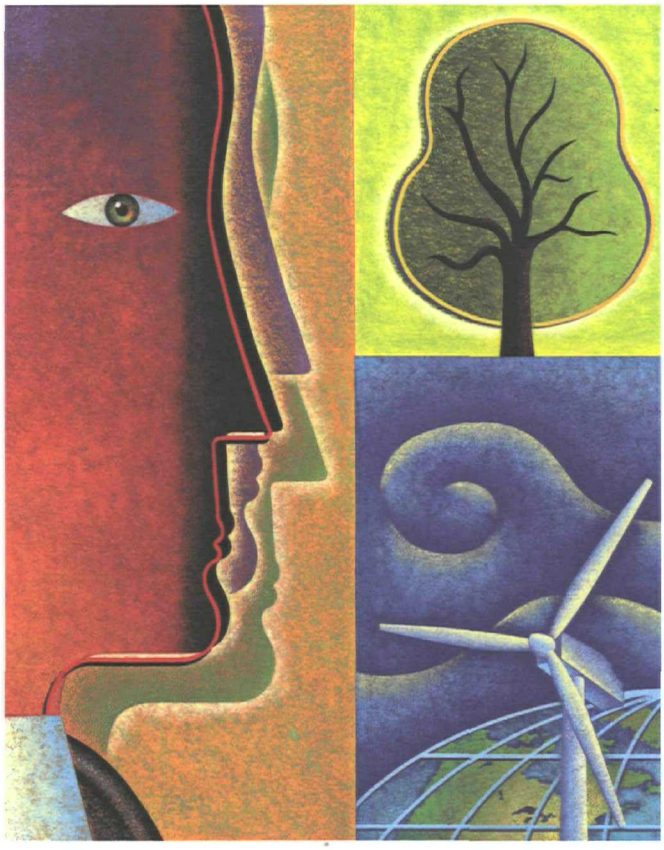
Workplan for Lemberger Landfill Water Level Head Demonstration Project

Revision 0

Lemberger Landfill Site
Town of Franklin, Wisconsin

October 2008



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October 2008

Prepared For
Lemberger Site Remediation Group

John M. Rice, P.E.
Senior Hydrologist

James E. Wedekind, P.G.
Senior Hydrogeologist

Kristopher D. Krause, P.E.
Senior Project Manager

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Section 1
Introduction

1.1 Background

Remedial actions were implemented at the Lemberger Landfill (LL) site in order to limit the potential for contaminant migration from the waste to the groundwater. The remedial measures have included (1) improving surface drainage and constructing a landfill cover over the entire 21-acre site to limit infiltration, (2) relocating waste and constructing a perimeter slurry wall to limit horizontal groundwater inflow and create an inward gradient, and (3) pumping leachate from eight perimeter extraction wells to lower perched groundwater (referred to in this document as groundwater/leachate) levels. The current Operation and Monitoring (O&M) Plan sets a target groundwater/leachate level for the remedial measures of 1 foot above the top of the clay confining unit (CU). An engineered landfill cover was installed to limit rainwater infiltration through the waste, and a perimeter slurry wall was installed and leachate extraction was performed to lower the groundwater elevation to prevent contact between the waste and the perched groundwater. The remedial measures have been effective in lowering the perched groundwater below the waste in all areas of the landfill; however, the elevation of the perched groundwater still exceeds the remedial goal of 1 foot above the top of the clay confining unit (CU) at several monitoring locations. Groundwater data collected from monitoring wells in the underlying bedrock aquifer have shown no impacts associated with the LL.

A conceptual model developed as part of the Leachate Head Evaluation Report (RMT, 2007) predicts that water levels will be maintained or will continue to decline with or without pumping. This prediction is supported by the lack of any increase in head levels during the period of August through October 2006, when maintenance problems with the extraction system resulted in limited removal of perched groundwater/leachate with no increase in water levels.

The analysis performed in the Leachate Head Evaluation Report (RMT 2007) identified and quantified the inflow and outflow of water to the LL to explain why the target head levels as specified in the O&M Plan are not being reached within the specified time frame. This analysis also identified some of the uncertainties in quantifying the water balance. These uncertainties include the rate of recharge through the cover and the vertical flow out the bottom of the LL, both of which were calculated using estimates of hydraulic conductivity that could be higher or lower by an order of magnitude. The flow through the slurry wall (inflow) is also dependent on

an estimate of hydraulic conductivity and on assumptions that the slurry wall is continuous and keyed in to the underlying clay.

The Leachate Head Evaluation Report recommended that a pilot test be performed for a period of 1 year, to evaluate how perched groundwater levels are affected by discontinued pumping. This pilot test will provide critical data that will determine the response of the head levels in the groundwater when pumping is discontinued. The proposed pilot test would pose no added risk to groundwater quality in the underlying bedrock aquifer for the following reasons:

1. The groundwater data suggest that there has been no measurable impact to groundwater quality in the bedrock aquifer from the LL. Additional sampling of the head wells is proposed as part of this Workplan to assess the quality of the shallow groundwater.
2. Groundwater head levels in the perched upper granular unit (UGU) would be monitored to document that they remain below the waste. The extraction system can be placed back into operation, if groundwater levels approach the base of the waste. Specific triggers are proposed in this Workplan that, if attained, groundwater/leachate extraction would resume.
3. Monitoring of the bedrock aquifer in downgradient monitoring wells will continue on a quarterly basis as part of the ongoing assessment of the groundwater impacts from the Lemberger Transport and Recycling (LTR) Site.

1.2 Purpose

The purpose of this Workplan is to describe the rationale for the proposed monitoring locations and the field procedures that will be used to collect data for the proposed demonstration project. Water quality and water level head data will be collected and used to evaluate the effects of discontinuing extraction of the perched groundwater at the LL and to support the conclusions and recommendations of the water level demonstration project.

Section 2
Methods of Investigation

This section presents further details of the methods to be used for the sampling and measuring of water levels at the leachate head wells. A summary of the major elements of the field activities is included below.

2.1 Groundwater Sampling

Groundwater samples will be collected from each of the seven leachate head wells and from monitoring wells MW-14R and MW-15R. Selecting these wells will allow a comparison to the results to the sampling of the leachate head wells that was performed in July 2000 (RMT, 2000). All of these wells are on the interior of the landfill slurry wall, as shown on Figure 1. The wells will be purged and sampled prior to the start of the demonstration project.

2.1.1 Groundwater Sample Collection

Groundwater samples will be collected using the low-flow sampling method. A submersible pneumatic bladder pump will be used to purge groundwater at a pumping rate of less then 1.0 liter per minute (L/min). The pump will be positioned near the bottom of the well. A flow-through cell will be used to monitor temperature, pH, specific conductance, dissolved oxygen (DO), and the oxidation-reduction potential (E_H) of the purge water. Purging will be considered complete when three successive readings of the DO and E_H parameters (one minute or more apart) have stabilized to within +/- 0.3 mg/L for DO and +/- 10 mV for E_H. After the purge water has stabilized, a groundwater sample will be collected using the same submersible bladder pump used for purging. The pump will be fitted with a new bladder and discharge tubing.

The bladder pump will be decontaminated between each sample by pumping a dilute solution of Alconox® (or equivalent) and water for 5 minutes, followed by pumping potable water through the pump for 10 minutes.

Groundwater samples will be sealed in certified clean, laboratory-supplied 40-mL sample vials. The samples will be kept free of headspace (air bubbles) and then placed in a cooler at 4°C for transportation to Pace Analytical Services in Green Bay, Wisconsin. At least one trip blank will accompany each cooler. Each cooler will be sent via an overnight courier service. Sample tracking will be documented using proper chain-of-custody procedures.

2.1.2 Groundwater Sample Analysis

Groundwater samples will be analyzed for VOCs, because they are the best indicators of potential risk to the underlying bedrock aquifer. Groundwater samples will be analyzed by Pace Analytical Services according to accepted protocols and the currently approved Quality Assurance Project Plan (QAPP) (RMT, April 2006). Groundwater samples will be analyzed for priority pollutant VOCs by SW 846-Method 8260. One duplicate groundwater sample and one matrix spike/matrix spike duplicate will be collected for quality control and quality assurance purposes. The groundwater sampler will collect one rinsate blank from the submersible pump. The laboratory results will include quality control deliverables, including the raw data and a QA/QC narrative for a CLP-equivalent data package.

2.2 Water Level Measurement

2.2.1 Measurement Frequency

Groundwater levels will be measured in the seven leachate head and two monitoring wells inside the barrier wall of the landfill . Groundwater levels will also be measured in six shallow monitoring wells adjacent to the landfill and outside the barrier wall on the same schedule. The wells in the monitoring program are listed in Table 1. Groundwater levels will be measured every 2 weeks from the start of the demonstration project (assumed to be January 1, 2009) through June 1, 2009, in order to capture the expected spring snowmelt/rainfall infiltration events. If groundwater/leachate head levels are stable or declining, the measurement frequency beginning June 1, 2009, will be decreased to monthly. The USEPA and the WDNR will be notified before the change to monthly measurements.

2.2.2 Elevation Triggers

If water levels rise, they will be compared with the "trigger" elevations that are presented in Table 2. The trigger elevations have been set at a level 1 foot below the base of waste at each well location. If the measured water level is above the trigger elevation, the leachate extraction system will be activated in the area where the exceedence was observed.

RMT will perform a system functionality check on each of the extraction wells each quarter, such that, should head levels rise, the extraction wells can be quickly placed back into service.

Section 3
Schedule and Reporting

Completion of the groundwater sampling event is estimated to require approximately 1 week. The water level monitoring will be conducted over the course of 1 year. A summary report of the demonstration project will be submitted within 90 days of the completion of the last measurement round. The summary report will include an analysis of the fluctuations in groundwater elevations during the demonstration project, as compared to historical trends. The conceptual water balance model of the landfill will also be revised based on the results of the demonstration project. Finally, the summary report will include conclusions regarding the effectiveness of the leachate extraction system with respect to reducing risk to groundwater quality in the underlying bedrock aquifer. Recommendations will also be presented for future monitoring at the site.

Section 4
References

RMT. 2000. Leachate head monitoring well results - Lemberger Landfill Site, Town of Franklin, Wisconsin. RMT, Inc. September 2000.

RMT. 2006a. Addendum to the quality assurance project plan for the monitored natural attenuation engineering demonstration project - Lemberger Landfill and Lemberger Transport and Recycling Site, Town of Franklin, Wisconsin. RMT, Inc. Revision 0, April 2006.

RMT. 2006b. Supplement to the addendum to the quality assurance project plan for the monitored natural attenuation engineering demonstration project - standard operating procedures for analytical methods. Lemberger Landfill and Lemberger Transport and Recycling Site, Town of Franklin, Wisconsin. RMT, Inc. April 2006.

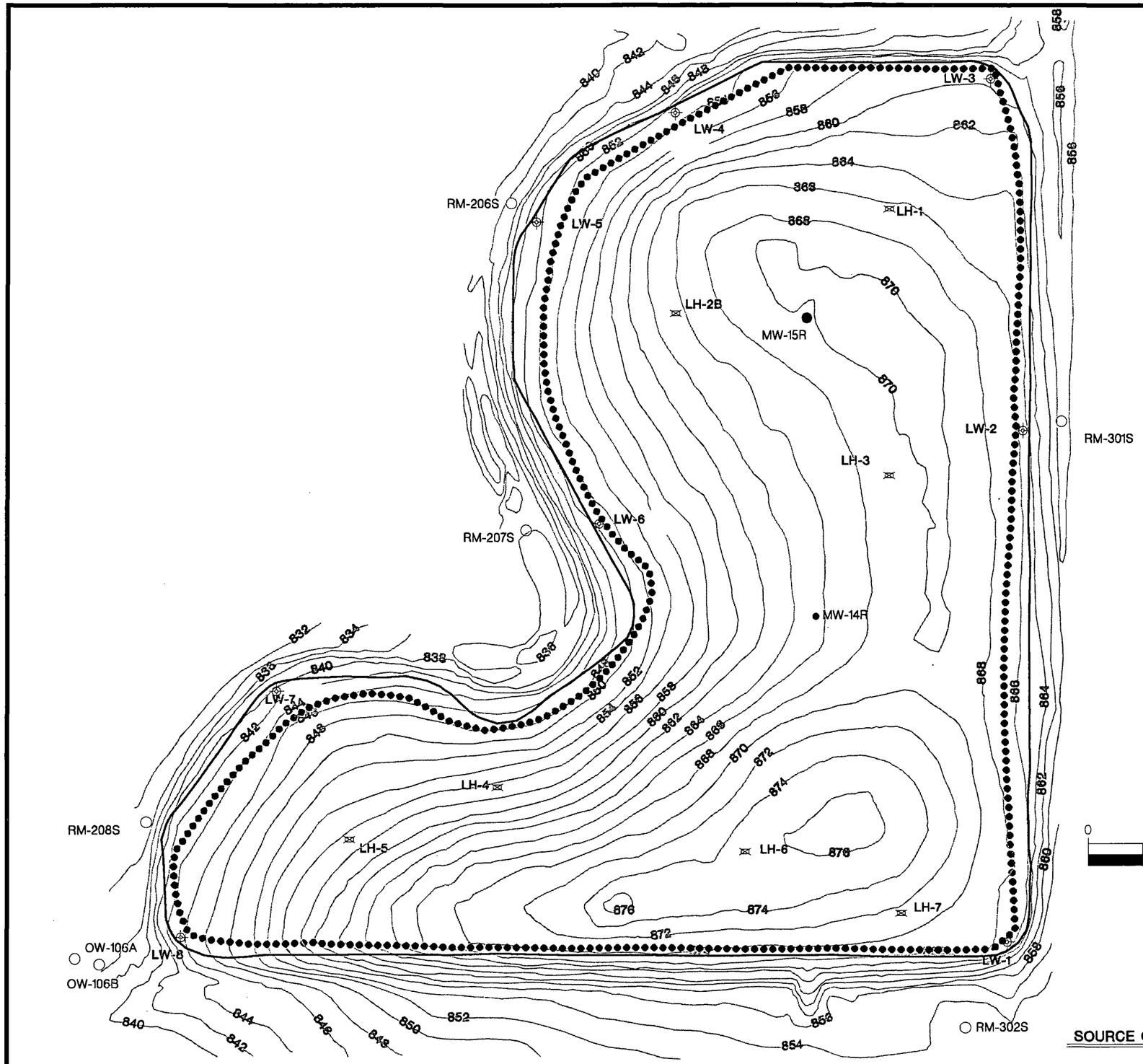
RMT. 2007. Leachate head evaluation report for the Lemberger Landfill. RMT, Inc. October 20.

Table 1
Monitoring Program

WELLS TO BE SAMPLED AND MONITORED FOR WATER LEVELS	WELLS TO BE MONITORED FOR WATER LEVELS ONLY
LH-1	OW-106A OW106B ?
LH-2B	RM-206S
LH-3	RM-207S
LH-4	RM-208S
LH-5	RM-302S
LH-6	RM-303S
LH-7	RM-301S ?
MW-14R	
MW-15R	

Table 2
Water Level Trigger Elevations

WELL ID	ELEVATION OF BOTTOM OF WASTE (ft NGVD)	TRIGGER ELEVATION (ft NGVD)	AUGUST 2008 ELEVATION (ft NGVD)
LH-1	839.0	838.00	830.60
LH-2B	835.0	834.00	831.02
LH-3	840.0	839.00	831.16
LH-4	847.0	846.00	829.98
LH-5	841.0	840.00	834.03
LH-6	852.0	851.00	847.07
LH-7	849.0	848.00	845.61
MW-14R	842.7	841.70	833.67
MW-15R	840.5	839.50	830.90



PLAN VIEW LEGEND

LH-7	LEACHATE HEAD WELL
LW-1	LEACHATE WITHDRAWAL WELL
RM-206S	GROUNDWATER MONITORING WELL, PERCHED SYSTEM
MW-15R	GROUNDWATER MONITORING WELL WITHIN SLURRY WALL BOUNDARY
NA	NOT APPLICABLE (WELL LOCATED OUTSIDE LANDFILL LIMITS)
840	10 FOOT CONTOUR LINES–LAND SURFACE
842	2 FOOT CONTOUR LINES–LAND SURFACE
	SLURRY WALL
	WASTE LIMITS

0 150 300

SCALE: 1"= 150'

SOURCE OF DRAWING

1. FINAL GRADES AND SITE FEATURES DIGITIZED FROM MALCOLM PIRNIE, "LEMBERGER LANDFILL CLOSURE, RECORD DRAWINGS," JANUARY 1997.

PROJECT:
LEMBERGER LANDFILL
TOWN OF FRANKLIN, WISCONSIN

SHEET TITLE:
MONITORING WELL LOCATIONS

DRAWN BY: METZA	SCALE: AS SHOWN	PROJ. NO.	03457.08
CHECKED BY: JMR		FILE NO.	34570801.DWG
APPROVED BY: KDK	DATE PRINTED: OCT 21 2008	**FIGURE 1**	
DATE: OCTOBER 2008			

RMT
744 Heartland Trail
Madison, WI 53717–1934
P.O. Box 8923 53708–8923
Phone: 608–831–4444
Fax: 608–831–3334

PLOT DATA
Drawing Name: J:\03457\45\34574502.dwg
Operator Name: metza
Scale: 1"=1500'